JOURNAL
OF THE
WASHINGTON ACADEMY OF SCIENCES
VOL. VI MARCH 19, 1916 No. 6

BOTANY.—*A remarkable new Eysenhardtia from the west coast of Mexico.*[1] WILLIAM E. SAFFORD, Bureau of Plant Industry.

In a recent paper on *Eysenhardtia polystachya*[2] the author called attention to the variability of that species and to the consequent difficulty in delimiting the species included in the group to which it belongs. Of those already described *Eysenhardtia orthocarpa* S. Wats. and *E. adenostylis* Baill. are held by some authorities to be specifically identical with *E. polystachya* (Orteg.) Sarg., and *E. amorphoides* H.B.K. is undoubtedly a synonym of it. So distinct from this group and from *Eysenhardtia spinosa* Engelm. and its allies is the plant I am about to describe, that it ought to be placed in a section apart from them. Its ten stamens are monadelphous instead of diadelphous, the style is not geniculate or hooked, the calyx is deeply instead of shallowly and broadly lobed, and it differs conspicuously from hitherto described species of Eysenhardtia in its spreading, compound, paniculate inflorescence and its very large retuse leaflets.

A critical study of the entire genus is greatly to be desired.

Eysenhardtia Olivana Safford, sp. nov.

A tree, 8 to 10 meters high, glandular-punctate throughout; heartwood dense and blackish; branches slender and spreading. Leaves alternate, usually odd-pinnate (only those of flowering branches observed); rachis 10 to 11 cm. long, grooved above; leaflets 7 or 8 pairs,

[1] Published with the permission of the Secretary of Agriculture.

[2] Eysenhardtia polystachya, *the source of the true lignum nephriticum mexicanum.* Journ. Wash. Acad. Sci. **5**: 503–517. 1915.

subopposite, stalked, oval or oblong-elliptical, finely granular-dotted, retuse at apex, rounded at base, the largest (near the middle of the rachis) 4 cm. long, 1.6 cm. broad, glabrous above, sparsely puberulent beneath (as seen under the lens); petiolules about 4 mm. long, densely glandular-tuberculate (in type specimen without stipels). Flowers small (about 8 mm. long), white, turning yellow in drying, crowded in spicate racemes, these forming the ultimate divisions of a spreading terminal compound panicle; branches of inflorescence finely cinereous-tomentose and glandular-punctate; pedicels very short and slender (1 mm. long), subtended by a minute acute sessile lanceolate deciduous bracteole. Calyx funnel-shaped, deeply divided into 5 nearly equal linear-oblong lobes (rounded at the tips), clothed on the outside with minute cinereous hairs and irregularly dotted with resinous globules. Corolla subpapilionaceous, composed of 5 distinct unguiculate petals, the standard (vexillum) twice as broad as the wings and keel petals, emarginate or retuse at the apex, carinate; wings and keel petals nearly similar, equalling the standard in length. Stamens 10, graduated in length, united into a cleft tube, the upper (vexillar) the shortest, the lower slightly exceeding the style; anthers similar, the pollen cells united by a relatively broad connective. Ovary nearly sessile, 1-ovuled, clothed with minute hairs; style terete, slender, not hooked at the tip, but with a slightly broader terminal stigma. Legume not observed.

Type in the United States National Herbarium, No. 385587, collected at La Correa, State of Guerrero, Mexico, at an altitude of 150 meters, October 1, 1898, by E. Langlassé (No. 395). "Arbre 8–10 m., bois précieux noirâtre; fleurs blanches. Nom indigène, *Palo de arco* [bowwood]."

This species is named in honor of the late Dr. Leonardo Oliva, Professor of Pharmacology in the University of Guadalajara, who first indicated the true botanical classification of the Mexican lignum nephriticum and identified *Eysenhardtia amorphoides* H.B.K. with *Viborquia polystachya* Ortega.

The accompanying figure is from a drawing of the type by Mrs. R. E. Gamble.

EXPLANATION OF FIG. 1.

Type specimen of *Eysenhardtia Olivana* Safford, showing the branching inflorescence, leaves, a flower, and the essential parts: *a*, flower with one petal removed, to show the stamens and pistil; *b*, resinous globule, detached from the calyx; *c*, cleft staminal tube with stamens, some of them deprived of their anthers; *d*, carpel, showing pilose ovary and style with terminal stigma; *e*, vertical section of ovary, showing solitary ovule; *f*, vexillar petal (standard); *g*, a wing petal; *h*, one of the keel petals. Leaves and inflorescence natural size; *a*, *c*, *d*, *f*, *g*, *h*, scale 5; *b*, *e*, scale 6.

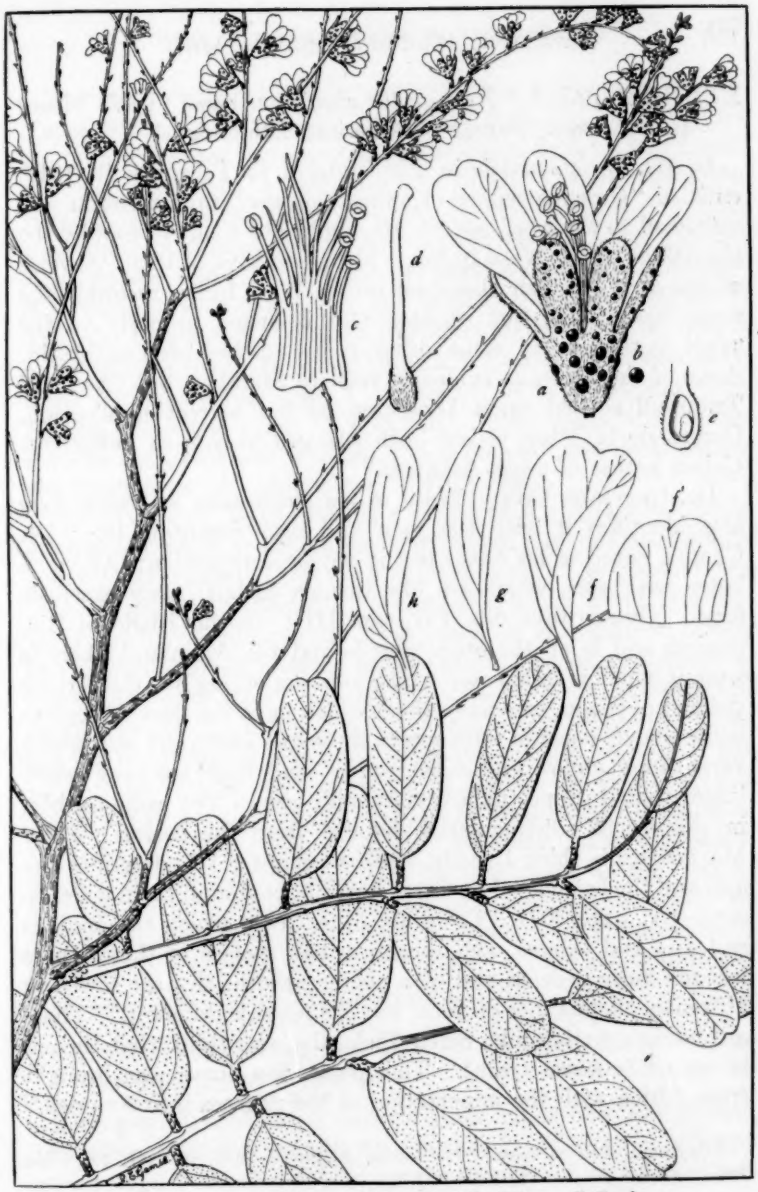

Fig. 1. Type specimen of *Eysenhardtia Olivana* Safford.

ETHNOBOTANY.—*Note on the aboriginal name "aje."* JOHN R. SWANTON, Bureau of American Ethnology.

In Mr. Cook's article in this JOURNAL for February 19, 1916, entitled "Quichua names of sweet potatoes" my attention was attracted to the word *age*, or *aje*, applied to a native root by the aborigines of the West Indies. Mr. Cook says of this: "Several of the early Spanish historians of the West Indies recorded the name *age* or *aje*, but whether this belonged properly to the sweet potato or to some other root-crop has been uncertain. Some of the accounts evidently refer to Manihot, but Gray and Trumbull settled upon Dioscorea as the correct application. Gomez de la Maza claims both *age* and *boniato* as indigenous Cuban names of sweet potatoes."

Dr. Cayetano Coll y Toste in his *Prehistoria de Puerto-Rico* also identifies it with the yam and says regarding it:[1] "Dr. Chanca noted in his letter to the Seville corporation: 'All come laden with *ages*, which are like turnips (nabos), very excellent food.' Oviedo says (lib. VII, cap. III): 'In this island of Hispaniola and in all the other islands and the Mainland, there is a plant which is called *ajes*, which look something like the turnips (nabos) of Spain, especially those which have the bark or surface white above, because there are of these *ajes* white and red, which verge upon violet, and some yellow, and they are very much larger than turnips (nabos) commonly are.' The same author, in chapter 82, distinguishes the *ajes* from the *batatas*. Peter Martyr in his third Decade, book V, chapter III, describes the *ajes* and the *batatas*. Las Casas does not confound them when he says (t.v. page 307): 'There are other roots which the Indians call *ajes* and *batatas:* and there are two species of these: these last are more delicate and of a nobler nature: thy are sowed in hills after the manner of *yuca*, but the plant is different.' There are modern writers like Señor Pichardo, who think that the *aje* is the white *ñame* (yam). This plant, the *ñame*, was brought from Africa with the importation of the negroes into America."

[1] Cayetano Coll y Toste. Prehistoria de Puerto-Rico, pp. 197, 198. San Juan, 1907.

The fact to which I wish to call attention is the close resemblance between this term *age* or *aje* and the terms applied to all kinds of "potatoes" by many of our southern tribes. The Creek and Alabama word is *aha*, but that of the Choctaw and the Hitchiti, the ancient inhabitants of southern Georgia, *ahe*. Along with some qualifying words this is used for the Irish potato, sweet potato, and yam, but it is also applied to a wild root which it is natural to suppose was the original plant so designated. The root to which the Alabama Indians apply the term, plus a qualifying adjective meaning "rough," *tcạgawa*, has been identified for me by Mr. Paul C. Standley, of the National Herbarium, as *Apios apios* (L.) MacM. Presumably this is the same as the Creek *aha akliwahi*, "mud potato," and the Choctaw *ahe kamạssa* or *ahe ahkạmassa*, "hard potato."

We have here the perplexing problem of a very similar name applied originally, to all appearances, to entirely unrelated plants and by derivation to the very same plants. The resemblance may be purely accidental, but I think it more likely that the word was borrowed from the West Indies by the southern tribes, or vice versa, as the name of several roots not perfectly discriminated from each other. Precisely the same thing has happened in the case of the name *kunti*. This was originally applied by the Creek Indians to the roots of several species of Smilax; but after those Creeks who came to be known as Seminole had invaded Florida, they found a Zamia in use there to which they gave the very same term. At first the older *kunti* was distinguished as the "red kunti" and the new plant as the "white kunti;" but later, or at least where only one of them was to be had, the qualifying adjective was dropped. It thus came about that the same word had a totally different application in different sections of the territory occupied by the same people.

TAXONOMY.—*Determining types of genera.* O. F. Cook, Bureau of Plant Industry.

Biological taxonomy is being rebuilt on a new foundation. The older method of naming by concepts is giving place to naming by types. Names are no longer thought of as relating pri-

marily to the definitions of the natural groups, but as attached to the groups themselves, through the medium of types. Each species has its type specimen, each genus its type species.

The method of naming the concepts was used by Linnaeus and his followers for over a century, but had to be abandoned on account of the confusion caused by names slipping away from their original application. Types not being recognized, the applications of the names varied with interpretations of the definitions. Two or more names often became current for the same genus, or the same name for two or more genera. How to place the older names on a type basis is still a problem.

Priority governs the acceptance of names and should also determine the application of names. Priority of application means that a name should remain with its original type. Certainly no practical purpose is served by accepting a name unless the application is determined. Names without applications are worse than useless.

Generic names that have been misapplied need to be restored to their original applications and fixed by the recognition of types. But by using wrong methods in the work of restoration it is possible to damage the taxonomic structure still more. Historical continuity is sacrificed when names are carried away from their original applications. This objection lies against all of the arbitrary methods of fixing types, whether we take as types the last species by elimination, the first species named, or the first species to be designated as type by a later author. The method of elimination is most defective, because it does not give the same results in the hands of different students and because it often leads away from the true type. Obscure names are brought out for prominent genera, and prominent names transferred to obscure species. The confusion is worse than if the transferred names had been discarded altogether.

The need of more care in determining the original applications of names may be illustrated by an example from millipeds. The generic name Spirobolus has been used for a very large group of tropical species with their chief center in South America. The genus was established by Brandt in 1833, with two species

named, *S. olfersii* from Brazil and *S. bungii* from northern China. The generic description relates entirely to the characters of the antennae and refers to a drawing of *S. olfersii*, the only species figured. The characters as stated and illustrated are applicable only to *S. olfersii*, so that a strict interpretation would exclude *S. bungii*. It seems plain that Spirobolus was based wholly on *S. olfersii*, and that this species must be considered as the true historical type of the genus.

Nevertheless, *Spirobolus bungii* has been designated as the type of the genus, on the ground that the establishment of Rhinocricus in 1881 had the effect of removing *olfersii*, so that only *bungii* was left. But now it appears that *olfersii* was not really removed, since Rhinocricus needs to be maintained as a distinct genus, with the Porto Rican *Rhinocricus parcus* as type. Even if *olfersii* and *parcus* were congeneric, there would still be no adequate reason why the publication of Rhinocricus should be supposed to take away the historical type of Spirobolus and change the application of the name. Obviously, any later name based on *olfersii*, or on any species truly congeneric with *olfersii*, should be treated simply as a synonym of Spirobolus.

Under the law of priority a name has to be replaced if another is older, but elimination often has the effect of replacing an older name by a later one. Changing the type makes it possible for a later synonym to supplant an old, well-known generic name, which is then slipped along to a different application. To assume that the naming of Rhinocricus could have the retroactive effect of transferring the name Spirobolus from a Brazilian genus represented by *olfersii* to a Chinese genus represented by *bungii*, is neither consistent with priority nor in the interest of stability.

Transferring Spirobolus to China has the effect of giving the same name to a second genus. Altering the application of the name subverts the law against homonyms. Future writers and readers must guard themselves against confusing the two genera to which the name Spirobolus has been applied.

Some taxonomists hold that the first formal designation of a type species, however arbitrary or erroneous, must be main-

tained; but such a rule leads, in cases like the present, to a mere shuffling of names, without historical warrant or practical advantage. It seems more reasonable to hold that in using *olfersii* exclusively as the basis of his genus Brandt himself designated the type of Spirobolus. The original application of the name should not be subject to change by any later author, either by proposing a new genus in the place of Spirobolus or by designating a different type for Spirobolus. Instead of being taken as the type of Spirobolus, *bungii* should be associated with Arctobolus, the genus of Spirobolidae that is dominant in the temperate regions of North America.

The case is one of many where types are not to be determined from considerations of nomenclature alone. It would be useless to ask a nomenclatorial expert or commission to rule upon Spirobolus without the pertinent facts. Instead of premature regulations and decisions, the need is for more facts and more thorough study of taxonomic problems. Adequate investigation might lead to simple and practical solutions that could be applied by any careful student.[1]

Complications have been increased unnecessarily in the effort to force a general adoption of an imperfect system. Priority has been pushed to extremes in the acceptance of names, only to be disregarded in determining the applications of names. Abortive names and synonyms that might well have remained in oblivion have replaced many well-known names, and others are being misapplied as a result of the practice of elimination. That botanists and zoologists are using different methods of typifying genera also shows how casual the study of taxonomic problems has been. Such divergence of views can only mean that the subject is not adequately understood, for the need of a stable taxonomy is the same in both branches of biological science.

[1] Other phases of the question have been treated in previous papers. See, *Terms relating to generic types*, The American Naturalist, **48**: 308; and *Fiat nomenclature*, Science, N.S., **40**: 272.

ZOOLOGY.—*A new starfish* (Lydiaster americanus) *from the Gulf of Mexico, representing a section of the subfamily Goniasterinae hitherto known only from the Indo-Pacific region.*[1]

AUSTIN H. CLARK, National Museum.

One of the most interesting of the new starfishes described in 1909 by Professor Koehler from the collections of the Royal Indian Marine Survey Ship *Investigator* was *Lydiaster johannae* which, with the closely allied genus *Circeaster* decribed at the same time, represented a hitherto unknown type of Goniasterinae. *Lydiaster johannae* was dredged only in a single locality off the southwestern coast of Ceylon in 401 fathoms, while the two species of *Circeaster* were found off the western coast of Ceylon and southern India in from 912 to 1053 fathoms. Thus, so far as known up to the present time, these two genera are confined to the Arabian Sea. The only genus closely related to these two, *Mariaster*, occurs off southern Japan.

But it appears that *Lydiaster* also inhabits the Gulf of Mexico, being represented in this region by a remarkable new species, in some respects intermediate between *Lydiaster* and *Circeaster*. This may be known as

Lydiaster americanus, sp. nov.

Five arms; R = 100 mm.; r = 35 mm.; R:r = 2.9:1; superomarginals 24.

General form pentagonal, with relatively narrow, evenly tapering arms, the length of which, measured actinally along the curve from a point directly below the commencement of the enlarged plates, is equal to the distance from the same point to the center of the interbrachial arc opposite. The diameter of the arms at the base (at the level of the distal border of the fifth superomarginal) is 19 mm. In the outer half the arms bend gradually upward, so that their terminal portion makes an angle of about 60 degrees with the plane of the disk.

Compared with *L. johannae* the interbrachial arcs are more nearly straight and the arms, which are narrower, appear to arise more abruptly.

The abactinal surface, which is somewhat swollen, is covered with small polygonal plates which are mostly subequal in size and irregular in arrangement; they vary from about 1 mm. to about 2 mm. in diameter, being usually about 1.5 mm.; just before the base of the arms the

[1] Published with the permission of the Secretary of the Smithsonian Institution.

plates become shorter radially, so that they appear to be transversely elongated; on the arms they slowly increase in size, though not in regularity, the largest being something over 3 mm. in diameter; in the distal half of the arm only one row of plates separates the superomarginals, and the last four or five superomarginals are in contact along the mid-dorsal line of the ray.

Each of the abactinal plates is bordered by a ring of flattened granules, there being from 20 to 24 about the largest; in the central portion of the abactinal surface each plate bears from two to six rounded granules, each inserted in a small pit; toward the periphery these become less numerous and less prominent, though they occur nearly to the marginals; the plates on the abactinal surface of the arms are somewhat more flattened than those of the disk, and the isolated granules are less common in their central portion; most of the plates on the disk bear spatulate pedicellariae with usually strongly dentate jaws, each sunk in a deep depression, but on the rays, except for one or two very small and imperfectly formed, these are lacking.

The papular areas, which are confined entirely to the disk, are very large; the only regions free from papulae are the center of the disk and low triangles about three times as broad as high based upon the superomarginals, in which areas also the plates decrease in size toward the border and do not bear pedicellariae. The papulae are smaller and less abundant in the mid-line of each ray than elsewhere, and this causes the mid-radial plates in the peripheral half of the disk to appear somewhat prominent.

The marginal plates of both series are 24 in number; but the inferomarginals are somewhat longer than the superomarginals, so that, although the two series correspond in the interbrachial arcs, in the distal part of the arms they alternate in position. The interbrachial arc as defined by the superomarginals is straight, as defined by the inferomarginals gently concave.

In abactinal view the superomarginals, which are markedly tumid, are seen to increase very slightly in width to the fifth, at the base of the rays, thence decreasing gradually distally; in lateral view they decrease regularly in height from the center of the interbrachial arc, where they are twice as high as the inferomarginals, to the distal third of the arm, where the plates of the two series are of about the same height. In the interbrachial arc the outer third of the superomarginals is vertical, and the inner two-thirds bends inward so that the inner half, which is flat, extends at an angle of about 45 degrees over the dorsal (abactinal) margin; on the arms the inner half becomes more nearly horizontal; here also the inner border of the superomarginals is straight, but on the arms it becomes slightly convex or angular. On the average the superomarginals, as viewed abactinally, are about twice as deep as long, those at the arm bases being somewhat longer, those toward the arm tips slightly shorter.

Each superomarginal carries on its surface numerous widely spaced deciduous granules arranged in the interbrachial arc roughly in five

alternating rows of seven or eight each, becoming less numerous distally; the granular area is confined to the median portion of the plate, though in the interbrachial arc it may reach the proximal border; in the interbrachial arc nearly all the superomarginals bear near their actinal border a very small deeply sunken spatulate pedicellaria; a narrow border of flattened squarish granules surrounds each superomarginal.

The inferomarginals are essentially similar to the superomarginal; viewed actinally they are seen to decrease in size from the center of the interbrachial arc to the arm bases, thence much more gradually to the arm tips; in the interbrachial arc in lateral view the inferomarginals are only half as high as the superomarginals (2.5 mm.), but they rapidly increase in height so that on the outer half of the arm the plates of the two series are nearly equal. The inner portion of the inferomarginals is everywhere horizontal, and the inner border is everywhere convex. A border of small squarish granules similar to that on the superomarginals is found on the inferomarginals, and the same granular ornamentation occurs on their surface, though the granules are rather more numerous. In the interbrachial arc the inferomarginals usually carry small excavate spatulate pedicellariae just within the upper border, and one or two additional on the ventral (actinal) surface; pedicellariae of both series occur irregularly to the terminal portion of the arms.

The actinal intermediate areas are extensive; the row of actinal intermediate plates adjacent to the adambulacrals, which extends to the sixteenth superomarginal (the distal third of the arm), is regular and the next row is regular to the arm bases; a partial third row may be traced, but within the triangular area between this and the inferomarginals the plates, which decrease in size, tend to become arranged in columns perpendicular to the inferomarginals.

In the center of each of the actinal intermediate plates is a large pedicellaria which resembles those on the adambulacrals, and is more or less proportionate in size to the plate; on the larger plates this is surrounded by several large rounded tubercles, beyond which are the lower tubercles forming the bordering series of the plates; on the smaller plates only the latter occur.

The adambulacral plates are oblong, from one-third to one-half again as broad as long, with a very slightly curved furrow margin which is not quite parallel to the groove, the proximal end being slightly more distant. The furrow series consists of five stout subequal truncated spines, mostly rounded-quadrate in section, the most proximal of which is so situated that it overlaps the most distal of the preceding series. Behind the furrow spines is a series of three or four tubercles, the most distal abruptly the largest, and behind these a long, low, *Hippasteria*-like bivalved pedicellaria placed somewhat diagonally with its distal end slightly nearer the mid-radial line. Beyond the pedicellaria is a series of two or three large tubercles, and beyond these a series of several smaller tubercles which, with similar tubercles, at right angles to the two ends of this series, delimit the borders of the plate.

The mouth plates are triangular and inconspicuous, about twice as

long as broad; the furrow margin is about equal to the edge adjoining the first adambulacral; the furrow series consists of seven short blunt spines, stouter than those on the adambulacrals, of which the innermost is broad, flat, and trapezoidal; just behind the two terminal spines in this series are two large tubercles; the remaining portion of the surface of the mouth plates is covered with about 18 spaced polygonal tubercles resembling those on the actinal intermediate plates, but somewhat larger.

The color in alcohol is white.

Type.—Cat. No. 10872, U. S. N. M., from "Albatross" Station 2395, Gulf of Mexico, in 347 fathoms.

ANTHROPOLOGY.—*The Greenland Eskimo: Pastor Frederiksen's researches.* JAMES MOONEY, Bureau of American Ethnology.

The great Arctic island of Greenland is held by Denmark, having been first colonized by the Norse about the year 1000, and re-occupied from Denmark in 1721, the first colony having become extinct long before, possibly through inroads of the Eskimo. Since the second occupation Lutheran and Moravian missionaries, under the auspices of the home government, have labored with such devotion and success among the aborigines that of approximately 10,000 Eskimo of pure or mixed blood all but a few hundreds along the most remote coasts are civilized, Christianized, self-supporting, and able to read and write in their own language, while living on the best of terms with the handful of colonists. So carefully has the Danish government safeguarded their interests that famine, intemperance, and foul diseases which are so rapidly destroying the race in Alaska and British America are virtually unknown in Greenland, as well as wars and rumors of wars with their white neighbors. Since 1861, with a few breaks, there has been published at Godthaab (Nûngme) on the west coast, a small monthly journal, the *Atuagagdliutit* or "Reading Miscellany," entirely in the Eskimo language, which for press-work, illustrations, and literary content is fairly equal to anything of the same size in this country. Another mission monthly journal, the *Avangnamiok*, is published under the supervision of Rev. V. C. Frederiksen, resident missionary at Holstensborg, one of the northernmost outposts of

civilization and well within the Arctic circle. Between pastoral visits and sick calls in an open skin kayak, or by dog sledge, from one to another of the small native settlements scattered for three hundred miles along the dangerous west coast, this devoted missionary—whose only white companions are his wife and two children and a couple of assistants—has found time to give to his charges in their own language a volume of church hymns, a brief history of Greenland, and several literary translations, besides making some important archeologic explorations.

In a paper upon "Eskimo Migrations," published originally in the native language in *Atuagagdliutit*, Mr. Frederiksen arrives at the conclusion, from linguistic, geographic, and archeologic evidence, that the Eskimo tribes reached Greenland from an original nucleus body in the extreme west. He believes that they traveled southward around the coast to the east, the Eskimo of the East Greenland coast representing the oldest migration, and decreasing in number toward the north by reason of the scarcity of game and of building material. The houses also dwindle in size as we proceed northward along the east coast. The Norse occupation about the year 1000 made a wedge of separation between the Eskimo of the east and west coasts for several centuries, but with the extinction of the Norse colony about 1490, probably from attack and final absorption by the natives, some of the eastern bands again moved down toward the south. Of those who remained behind, the most northerly, beyond Angmagsalik, finally became extinct by starvation through the gradual diminution of the whale and seal, while the more southern tribes were saved from the same fate only by the kindly care of the later Danish colonists. The Eskimo of South Greenland have probably a considerable strain of the old Norse blood, which may help to account for their superior capacity for civilization.

The prevailing early house type of the South Greenland Eskimo, on both the east and west coast, as shown by the ruins, was rectangular, but about Sukkertoppen and Holstensborg, 65° to 68° N., Mr. Frederiksen has discovered numerous remains of semi-subterranean houses of circular form, always in groups,

sometimes of twenty together, resembling those about Cape York in North Greenland and about the mouth of the Mackenzie and westward. These round houses he considers to represent a later migration or period; in fact, in one instance he found the ruins of the round house within the remains of a larger rectangular house. The stone lamps found in these round houses have always a partition wall, as among some of the far western Eskimo, to separate the oil from the blubber. Other objects found, obtained from whaling ships, would indicate a period not earlier than 1700. The modern Greenland house type is also rectangular, except in the extreme north. In the same neighborhood he found also the remains of a great circular structure, of the type of the assembly house of the Alaskan Eskimo.

ANTHROPOLOGY.—*An archeological note.* TRUMAN MICHELSON, Bureau of American Ethnology.

Squier and Davis in their *Ancient Monuments of the Mississippi Valley*, pages 249, 250, discuss a gray sandstone pipe now deposited in the museum of the Historical Society of New York. They show quite clearly that this is the original of the drawing by Choris in his *Voyage Pittoresque;* and they demonstrate that there must be some mistake as to the provenience of this pipe, for there are no ancient tumuli in Connecticut. The purpose of this note is to elucidate this last point. I call attention to the fact that the Sauk pipe shown in the plate at the end of volume 2 of Beltrami's *Pilgrimage* belongs to the same culture as the one shown in figure 149, page 249, in the work of Squier and Davis. I have seen a photograph of the original of the latter, and it is far closer to the Sauk pipe than the drawing indicates. If the drawing of Beltrami is no closer to the original than is that of Squier and Davis to its original, it is possible that the originals of both are the same. Even if they are not the same, I think the above will have made clear that the provenience of the pipe shown in the work of Squier and Davis must be the upper Mississippi region, near the Rock river, where the Sauk had their principal encampment when Beltrami visited their country, viz., 1823.

ABSTRACTS

Authors of scientific papers are requested to see that abstracts, preferably prepared and signed by themselves, are forwarded promptly to the editors. Each of the scientific bureaus in Washington has a representative authorized to forward such material to this journal and abstracts of official publications should be transmitted through the representative of the bureau in which they originate. The abstracts should conform in length and general style to those appearing in this issue.

PHYSICAL CHEMISTRY.—*The preparation of pure iron and iron carbon alloys.* J. R. CAIN, E. SCHRAMM, and H. E. CLEAVES. Bureau of Standards Scientific Paper No. 266. Pp. 26. 1916.

As previous work on the iron-carbon diagram is unsatisfactory because of the great variation in the materials used, it was thought desirable to produce at the Bureau of Standards a series of alloys of great purity to form the basis of a redetermination of the diagram. The general method pursued consisted in melting electrolytic iron with sugar carbon in magnesia crucibles. The electrolytic iron was prepared from ingot iron anodes in a chloride bath with or without the use of porous cups. The operation of melting the iron with carbon gave great trouble at first, because the ingots obtained were full of blowholes and contained considerable quantities of impurities. These difficulties were overcome by melting in a vacuum furnace, and making the crucibles of especially pure magnesia, made and calcined with great care at the Bureau of Standards. A satisfactory procedure was finally worked out and a series of alloys prepared of the composition Fe + C = 99.96 per cent. H. E. C.

GEOLOGY.—*Mount Shasta—some of its geological aspects.* J. S. DILLER. Mazama, **4**: December, 1915, 11–16, illustrations and maps.

Stress is laid on the geologic basis for differentiating the Cascade Range and the Klamath Mountains from the Sierra Nevada and Coast Ranges. Mount Shasta is a mass of hornblende and hypersthene andesites rising more than 10,000 feet above its base of Paleozoic and Mesozoic rocks. It is bordered on the east by later basalts and

crowned by 5 small glaciers of which the Whitney glacier, the largest, is $2\frac{1}{5}$ miles in length. Near the summit are several fumaroles, a residual of its waning volcanic heat. J. S. D.

GEOLOGY.—*Geology and mineral resources of Kenai Peninsula, Alaska.* G. C. MARTIN, ARTHUR HOLLICK, BERTRAND L. JOHNSON, and U. S. GRANT. U. S. Geological Survey Bulletin No. 587. Pp. 243, with maps, sections, and views. 1915.

The volume consists of five papers entitled:

General features of Kenai Peninsula. G. C. MARTIN.

The western part of Kenai Peninsula. G. C. MARTIN.

Correlation of the Kenai flora. ARTHUR HOLLICK.

The central and northern parts of Kenai Peninsula. BERTRAND L. JOHNSON.

The southeastern coast of Kenai Peninsula. U. S. GRANT.

This volume contains the results of reconnaissance investigations of a region about 9400 square miles in area situated on the Pacific coast of south-central Alaska. It presents a summary of what is known of the geography, geology, and mineral resources. Some parts of the peninsula have been studied in considerable detail, others have been traversed only hastily, and information concerning considerable areas is almost lacking.

The Kenai Peninsula includes two sharply defined, and geographically and geologically dissimilar, districts, the Kenai Mountains and the Kenai lowland. The Kenai Mountains have a general altitude of from 3000 to 5000 (maximum, 6400) feet and are in large part occupied by glaciers. They are composed of thoroughly indurated, partly metamorphosed, and highly folded rocks that include slates and graywackes of undetermined age in the main mountain mass, and Upper Triassic and Lower Jurassic limestones and pyroclastics on the western border. Some intrusive masses, chiefly granitic, but including also felsic (acidic) dikes, are present. The Kenai lowland has a general elevation of from 50 to 200 (maximum, 2000) feet. It is composed of slightly indurated and gently folded Tertiary (Eocene?) coal-bearing (non-marine) sands and clays overlain by extensive Quarternary deposits.

The general stratigraphic sequence in the Kenai Peninsula is as follows:

Quarternary

Recent alluvial deposits

Glacial and terrace gravels

Tertiary
Kenai formation (sands and clays, with lignite beds, and containing fossil plants)
Lower Jurassic
Tuffs with marine fossils
Upper Triassic
Limestone and tuff with marine fossils
Chert
Triassic (?)
Ellipsoidal lavas
Paleozoic (?)
Slates and graywackes
Schists

Metalliferous deposits occur as veins, stringer lodes, and mineralized felsic (acid) dikes, and these follow two sets of fissuring approximately at right angles to each other. The ore deposits are chiefly auriferous, but some copper-bearing lodes have been found. The mineralization is probably due to the action of mineral-bearing solutions (magmatic waters) that were forced out of the deeper parts of the igneous magma during its solidification. G. C. M.

MINERALOGY.—*The chemical composition of bornite.* EDGAR T. WHERRY. Science, **42**: 570–571. 1915.

Discussion of a paper by Rogers (Science **42**: 386. 1915.) It is suggested that the variability in the composition of bornite (normally Cu_5FeS_4) is due to the presence of submicroscopic inclusions of one or more of the minerals often occurring as visible inclusions in it, namely chalcocite, chalcopyrite, and pyrite. E. T. W.

MINERALOGY.—*Notes on allophanite, fuchsite, and triphylite.* EDGAR T. WHERRY. Proceedings of the U. S. National Museum, **49**: 463–467. 1915.

A description is given of a specimen of allophanite from Utah. Its index of refraction varies with the water content, being the average of the indices of the constituents, which is regarded as evidence that no complete chemical combination between them exists. Occurrences of fuchsite in Pennsylvania and Colorado are described, and the percentages of chromium oxide present are given. A new locality for triphylite in New Hampshire is announced and its composition discussed. It contains 60 per cent lithio-ferro-triphylite and 37 per cent lithio-mangano-triphylite. E. T. W.

PROCEEDINGS OF THE ACADEMY AND AFFILIATED SOCIETIES

THE PHILOSOPHICAL SOCIETY OF WASHINGTON

The 765th meeting was held on January 8, 1916, at the Cosmos Club. President Briggs in the chair, 50 persons present. The minutes of the 763d meeting were read in abstract and approved.

Mr. H. N. HECK presented by invitation a communication entitled, *Detailed submarine relief, a practical method of development.* The amount of detail required for submarine relief depends upon whether the point of view is scientific or utilitarian. The standard methods of obtaining knowledge of submarine relief were described and the reason given why these are insufficient in many parts of the earth. The development of the wire-drag method was described and that method mathematically defined. The importance of geological accidents in submarine relief was emphasized and two forms of especial importance pointed out. Slides were shown to illustrate cases where submarine relief agrees closely with the adjacent land forms and also to show, by examples selected from all parts of the United States, Alaska, and elsewhere, where there is marked disagreement, or forms entirely unexpected. Two ways were indicated in which geology can assist in determining where the wire-drag method must be applied. The question is open whether it is possible to predict from available geological information the existence or absence of certain forms of submarine relief. The effect of submarine relief on the three principal motions of the sea was briefly discussed.

Discussion: Mr. WRIGHT referred to dangers from hidden rocks experienced during geological expeditions in Alaskan waters. Mr. HAZARD asked how often it was necessary to change the height of the drag. Mr. SOSMAN called attention to the recent discovery of a pinnacle of rock in the Liverpool Channel. Mr. HECK stated that it was sometimes necessary to change the height of drag every 20 minutes. The Chair expressed to Mr. Heck the thanks of the Society for his very interesting communication.

Mr. A. L. THURAS presented a paper entitled, *A method of determining densities at sea and its use in locating ocean currents.* A new method of ocean-density measurement particularly adapted to sea conditions was briefly discussed. The temperature of the water sample was varied until its density was just equal to that of a glass "bobbin." A calibration curve was shown giving the density of the sample at ·15°C. in terms of the equilibrium temperature. The accuracy attained was greater than 0.008 per cent. A continuous

record of the ocean temperature near the surface was also obtained, and each gave evidence of the location of ocean currents. Charts giving these data and thus locating the Labrador Current and the Gulf Stream in the vicinity of the Great Bank were shown. The density (reduced to 15° C.) of the Labrador Current was about 1.0245, of the Gulf Stream 1.0270; but the actual densities *in situ* were respectively 1.0267 and 1.0266. The width of the Labrador Current at latitude 45° N. was 65 miles and at 44° N. only 25 miles. Detail temperature curves showed beautifully the interdiffusion of the two streams at the southern end of the Great Bank. The results in general corroborate the current charts of Captain C. E. Johnston.

Discussion: Messrs. SOSMAN, WHITE, and HUMPHREYS discussed the possibility of the Labrador Current diving under the Gulf Stream. Captain Johnston stated that by observing icebergs he had come to the conclusion that the Labrador Current acts like a band; when a great quantity of cold water accumulates it sweeps under the Gulf Stream or breaks through irregularly. Mr. STILLMAN asked whether it was feasible to measure densities by measuring resistances. Mr. DICKINSON stated that salinities could be measured by electrical methods in the laboratory but that difficulties would be encountered at sea. Mr. SWANN suggested the use of the string galvanometer for work on board ship.

Mr. P. V. WELLS then spoke on *The study of fog at sea.* The speaker described the work on fog done aboard the ice-patrol cutter *Seneca* during a cruise in May, 1915. The nucleation, the number of persistent nuclei per cubic centimeter, was measured three times daily by the corona method of Barus. The error was less than 15 per cent. Generally the nucleation was high in cyclonic areas, from which it was inferred that the nuclei at sea are mainly salt particles—evaporated spray. The nucleation was never below 400, normally 1000, and three times rose to 50,000. The liquid content, or grams of liquid water per cubic meter, was determined by evaporating the fog electrically and measuring the humidity at the higher temperature. A value, 0.7, with an error of less than 20 per cent, was obtained. The size of the fog particle was 5×10^{-4} cm. A rise of 1°.4 C. would dispel this fog, and as an inversion of 2°.5 was observed at the masthead, the fog did not extend that high. The speaker suggested the possibility of seeing from the masthead a powerful light or a flag on the masthead of a nearby ship.

Discussion: Mr. SWANN stated that the measured ionization over the sea is about as great as over the land; on land it is possible to account for 5 ions per cubic centimeter, while over the sea it is possible to account for only 1½ ions per cubic centimeter. Mr. WELLS stated that the nuclei over the sea were less numerous than over the land, which is in agreement with observations of atmospheric electricity. Barus suspected a connection between nuclei and ionization; it would have been an improvement had it been possible to observe nucleation and ionization simultaneously.

The 766th meeting was held on January 22, 1916, at the Cosmos Club. President Briggs in the chair, 51 persons present. The minutes of the 765th meeting were read in abstract, corrected, and approved.

REGULAR PROGRAM

Mr. C. G. ABBOT presented a paper entitled, *New proofs of the solar variability*. The Smithsonian Astrophysical Observatory has investigated for 12 years the intensity of solar radiation. In speaking of the variability of the sun we do not refer to variations caused by the atmosphere of the earth or by the yearly fluctuations of the earth's solar distance. The latter are readily eliminated. The elimination of atmospheric influences depends on spectrobolometric observations at different altitudes of the sun, reduced in accordance with sound theory. Experiments at Washington, Mount Wilson, Mount Whitney, and Bassour (Algeria), under circumstances differing widely as to atmospheric temperature, pressure, humidity, and length of path, are in close agreement in their indications of the intensity of solar radiation outside the atmosphere. The results are further checked by confirmatory observations at different altitudes ranging on the earth from sea-level to Mount Whitney, and by manned balloons to 8000 meters, and by sounding balloons to 25,000 meters. Variations of solar emission of radiation were indicated by Mount Wilson observations and confirmed by simultaneous work at Bassour, Algeria. A correlation coefficient of 50 ± 7 per cent is found between the variations noted at the two stations. This leaves the chance of accidental correlation 1 in 25,000. Four years of pyrheliometry at the Arequipa, Peru, station of the Harvard College Observatory, under direction of Professor E. C. Pickering, are now being published by the Smithsonian Institution. This work confirms the solar variability from day to day, and from year to year, found at Mount Wilson. Measurements of the distribution of radiation along the diameter of the solar image have been made by the Smithsonian observers at Washington and at Mount Wilson. Fluctuations of contrast between the center and the edge of the sun are found to occur in all wave-lengths, but greater for short wave-lengths than for longer ones. These fluctuations occur from day to day and from year to year. Both kinds of changes are correlated in time with changes in solar radiation. Curiously the correlation is in opposite senses for long-period and short-period changes. When great solar activity prevails, as shown by sun-spots, faculae, etc., high solar-radiation values predominate, and a greater contrast of brightness between the center and the edge of the sun is found. But when irregular changes of the solar radiation occur in the short period, they are associated with less contrast of brightness between the center and the edge of the sun. The first type of change was explained as a temperature effect, the second as due to changes of transparency of the outer solar envelope. The paper was illustrated by lantern slides.

Discussion: Mr. SWANN pointed out that some of the data determined from variation in the sun's atmosphere were suggestive of selec-

tive absorption; he also questioned the extent to which the sun may be treated as a black body, particularly in the ultra-violet region. Mr. HUMPHREYS asked whether there was any connection found between the daily fluctuations of the solar constant and the changing barometric pressure at the same time. Mr. ABBOT stated that the work did not indicate selective absorption since the differences from all wave-lengths are not found to be in the same sense; there appears to be no connection between the daily variations of solar constant and barometric pressure.

Mr. L. A. BAUER then presented a paper entitled, *Corresponding changes in the earth's magnetic field and the solar radiation.* Recent investigations with the aid of later solar and magnetic data have confirmed the author's preliminary conclusions of 1914 and 1915. It is again found in the majority of cases (about 80 per cent) that increased intensity of solar radiation, as shown by the changes in solar-constant values possessing the accuracy of those of the Smithsonian Institution, is accompanied by an appreciable decrease in the constant used as a measure of the intensity of the earth's magnetic field. While the magnetic effect, observed on the average, is such as accompanies the heating of a magnet, it is, apparently, not to be referred to such a cause. A preliminary examination of the magnetic effects in different parts of the earth indicates that the seat of the system of forces causing the effects is not within the earth itself but in the regions above us. In conclusion, it was pointed out that, from the standpoint of terrestrial magnetism, observations dependent solely upon the thermal energy of solar radiation can not be given any greater significance than that they may indicate some change in solar activity. Thus changes in the solar constant may not be regarded as a true, or adequate, measure of the various ionizing agencies (ultra-violet light, corpuscular radiations, electrons impinging upon our atmosphere, etc.) which are, at present, believed to be ultimately the cause of the magnetic effects. To the pyrheliometer, the bolometer, and meteorological appliances, must be added the magnetic needle, if we wish to get as complete a representation as possible of the various effects attributable to our sun, directly or indirectly.

Discussion: Mr. SWANN stated that computations, assuming the total energy of the spectrum could be wholly absorbed in the upper atmosphere, indicated the resulting ionization would be only 1/100 of that required to account for the diurnal variation if we accept Schuster's theory. Mere heat and light radiation could not account for the conductivity.

INFORMAL COMMUNICATIONS

An apparatus for making hydrostatic weighings, developed for finding the volumes of precision weights, was shown and described by Mr. A. T. PIENKOWSKY. The chief aim in designing the apparatus was to allow fairly accurate measurements to be repeated quickly, and to provide for the easy handling of several different sized objects in succession. A scale-pan, essentially a flat grid, is suspended by a wire coated

with a rough, spongy coating of gold, applied electrolytically. An arrestment table, meshing with the scale-pan and raised or lowered by a rack and pinion, allows the object to be put on or taken off from the scale-pan with the least possible disturbance. A guard ring surrounds the suspension-wire at the surface of the water to help maintain a uniform surface-tension on the wire.

The 767th meeting was held on February 5, 1916, at the Cosmos Club. President Briggs in the chair, 58 persons present. The minutes of the 766th meeting were read in abstract and approved.

REGULAR PROGRAM

Mr. E. C. BINGHAM presented by invitation a communication, illustrated by lantern slides, entitled, *Plastic flow.* (To be published in a later number of this Journal.)

Mr. E. BUCKINGHAM then presented a paper entitled, *Notes on the theory of efflux viscosimeters.* The paper was concerned with the relative determination of the viscosities of liquids, in terms of the viscosity of some standard liquid, by the commonly used efflux method. Instruments for making such comparisons must, in general, be standardized, or have their "scales" determined, by means of a series of liquids of which the relative viscosities have already been found by other methods. The speaker's purpose was to show how the necessity for such a standardization might be obviated and the series of standardizing liquids dispensed with. It was shown, by dimensional reasoning, that whatever be the nature of the orifice or mouth-piece through which the liquid is discharged, if the driving head be so adjusted that its square root is proportional to the rate of discharge, the rate of discharge will itself be proportional to the kinematic viscosity of the liquid. Hence when this adjustment of the conditions has been effected, the kinematic viscosities of two liquids are directly as their observed rates of efflux. A viscosimeter which is so arranged that this adjustment may be made need not be standardized at all, unless absolute values are required; and in that event a single standard liquid of known kinematic viscosity suffices. It was shown that if the viscosimeter is a cylindrical burette with a small oriffice at the bottom, and if the observations consist in readings of the times at which the surface of the liquid passes the marks on the burette as the liquid flows out at the bottom, the inconvenient process of adjustment previously mentioned may be dispensed with and the result obtained graphically. The paper concluded with several suggestions regarding the practice of the proposed method of viscosimetry.

Discussion: Mr. BAUER asked what liquid would be best suited as a standard. Mr. ABBOT asked what degree of accuracy is practically desired; if the accuracy wanted is high, is not the adhesion to the side of the tube a difficulty? Mr. BUCKINGHAM stated that water would be the best standard but that the practical requirements would make necessary other intermediate standards as the viscosity increases.

Mr. HERSCHEL stated that an accuracy of 5 per cent is sufficient for technical purposes. In investigating efflux viscosimeters he has found a modification of Grüneisen's diagram very helpful. Plot as ordinates $\frac{vd\rho}{\eta}$ and as abscissas $\frac{\pi r^4 ghl\rho}{8Vl\eta}$. If the commonly accepted Ubbelohde form of equation were correct, we would have a straight line cutting the X-axis at a distance $\frac{l+\lambda}{l}$ from the origin, where $(l+\lambda)$ is the effective length of capillary, and making an angle whose tangent is $\frac{32l}{md}$ with the X-axis; m is the kinetic-energy coefficient which is 1.12 according to Boussinesq. Mr. Herschel finds that m is variable when a certain velocity is exceeded.

INFORMAL COMMUNICATION

Mr. L. A. BAUER discussed *Some corresponding changes in solar radiation, terrestrial magnetism, and astronomy.* With the aid of lantern slides, striking similarities were shown to exist between the following 3 curves: (1) Curve of changes in the solar constant, 1905–1914; (2) curve of anomalies in the regularly progresing secular variation of the earth's magnetic field, 1905–1913; and (3) curve of mean irregularities in motion of Mercury, Venus, the moon, and the earth, 1905–1913. Astronomers having exhausted the possibilities of explaining the outstanding astronomical motions by gravitational causes, are now seeking for some connection with effects arising from possible interacting magnetic fields of planets. Inquiries received at various times from astronomers, notably from the late Professor Newcomb, have led the speaker to undertake an examination into the various questions involved. As the first step, he has established a tentative formula which gives the magnetic field strength of the sun within 10 per cent of Hale's provisional value, and shows that a magnetic field possibly to be associated with Jupiter may have a strength almost that of the sun, namely, about 68 times that of the earth.

The Chair expressed to Mr. BINGHAM the thanks of the Society for his most interesting communication.

J. A. FLEMING, *Secretary.*

THE GEOLOGICAL SOCIETY OF WASHINGTON

The 300th meeting was held in the lecture room of the Cosmos Club on November 24, 1915.

INFORMAL COMMUNICATIONS

D. F. HEWETT: *Manganese deposits in Virginia.* Among six deposits examined five showed a striking relationship to topographic features. The deposits lie at the base of the Blue Ridge, where the Tertiary plain merges with the hills, and occupy old river channels

in the plain. It seems plausible that they were formed while the plain was being developed and during a climatic cycle more favorable than the present one; i.e., under milder and more humid conditions.

Discussion: SIDNEY PAIGE inquired as to the source of the manganese. Hewett replied that there had been considerable speculation on this matter; it seems likely that it was derived from basic silicates in certain shale beds. T. WAYLAND VAUGHAN spoke of the climate of the Eocene in the Gulf States, as shown by marine fossils. In the early Eocene the climate was tropical, in the middle Eocene somewhat cooler, and in the late Eocene tropical again.

REGULAR PROGRAM

L. W. STEPHENSON: *Correlation of the Upper Cretaceous deposits of the Atlantic and Gulf Coastal Plain.* (Illustrated.)

The Upper Cretaceous sediments of the Atlantic and Gulf Coastal Plain are chiefly medium to fine-grained clays, sands, chalks, and marls, ranging in origin from those laid down on low coastal plains, in estuaries or in very shallow seas, to those formed in waters perhaps exceeding 100 fathoms in depth. In our present state of progress the fossils most usable in determining the age relations of the marine sediments formed in waters ranging in depth from moderately shallow to 50 fathoms or more are the representatives of the genus *Exogyra*, which were adapted for life in all but the very shallowest of the Upper Cretaceous marginal seas and which underwent evolutionary changes with sufficient rapidity to form faunal zones traceable through contemporaneous formations.

Three principal zones have been differentiated, which, in ascending order, are: (1) The zone of *Exogyra upatoiensis*, which is at the base of the Eutaw formation in the Chattahoochee region; (2) the zone of *Exogyra ponderosa*, which has been traced from New Jersey to the Rio Grande. On the basis of fossils other than *Exogyra* this zone is separable into two parts,—lower and upper. The former is traceable from Georgia to the Rio Grande, and the latter from New Jersey to the Rio Grande; (3) the zone of *Exogyra costata*, which has been traced from New Jersey to Mexico. This zone is roughly separable into three parts: a lower, characterized by a variety of *Exogyra costata* with broad costae; a middle, characterized by a variety with costae of medium breadth; and an upper, characterized by a variety with narrow costae.

The correlations based on the *Exogyra* zones and subzones are supported by many other molluscan species of restricted stratigraphic range and more or less extended geographic range.

Tables and charts were shown illustrating the physical and age relations of the formations, the stratigraphic position of the species and varieties of *Exogyra*, and the correlation of the formations with each other and with the Upper Cretaceous deposits of the Western Interior and of Europe.

G. R. MANSFIELD and P. V. ROUNDY: *Some Jurassic and Cretaceous formations of southeastern Idaho.* (Illustrated.)

In the Montpelier and Wayan 30-minute quadrangles of southeastern Idaho parties of the Geological Survey have found great thicknesses of strata, aggregating 17,000 feet or more, that have hitherto been assigned to the Beckwith and Bear River formations. On the maps of the Hayden Surveys both formations are included in the Laramie. The Beckwith has been assigned to the Cretaceous or Jurassic, and the Bear River to the Upper Cretaceous. There is such lack of agreement between the formations in the quadrangles named and the Beckwith and Bear River formations in their type localities that it now seems inadvisable to continue the use of the names Beckwith and Bear River in this district. Three groups of strata are recognized, the lowest of which is marine Jurassic and rests unconformably upon the Twin Creek limestone, the main Jurassic formation of the region. The two higher groups are non-marine and probably Lower Cretaceous. They are separated from each other by an unconformity, but the lower group appears to be conformable on the Jurassic beds below. The two higher groups have some resemblances to the Kootenai, but the data are at present insufficient for their correlation with that formation. No characteristic Bear River fossils have been found in the district, though such have been found farther north, and there is a possibility that the doubtful beds may grade upward into the true Bear River in that direction. The beds formerly called Beckwith are divided into seven formations and a new name is given to the strata hitherto called Bear River. The paper gives a statement of the stratigraphic problems involved, together with a description of the formations.

Discussion. C. J. HARES asked if the pebbles of the conglomerate described could be attributed definitely to any older formation. Mansfield replied that many different formations were probably represented but could not be definitely recognized. T. W. STANTON remarked on the lithologic and successional differences in this section from those in adjacent sections. He said also that the formations between the marine Upper Jurassic and the marine Upper Cretaceous still needed much study before it would be possible to make definite correlations.

A. C. SPENCER: *Gold deposits of the Atlantic and South Pass Districts, Wyoming.* (No abstract.)

At the 301st meeting, held December 8, 1915, the presidential address was delivered by the retiring president, T. WAYLAND VAUGHAN: *Some problems in the geologic history of the perimeters of the Gulf of Mexico and the Caribbean Sea.* The address will be published at a later date.

At the twenty-third annual meeting the following officers were elected for the ensuing year: *President*, ARTHUR C. SPENCER; *Vice-Presidents*, W. C. MENDENHALL and F. H. KNOWLTON; *Secretaries*, CARROLL H. WEGEMANN and H. E. MERWIN; *Treasurer*, S. R. CAPPS; *Members-at-large of the Council*, B. S. BUTLER, C. W. GILMORE, G. F. LOUGHLIN, H. S. GALE and R. W. PACK.

C. N. FENNER, *Secretary.*

THE BOTANICAL SOCIETY OF WASHINGTON

The 110th regular meeting of the Botanical Society of Washington was held in the Assembly Hall of the Cosmos Club at 8 p.m., Tuesday, February 1, 1916. Fifty-three members and four guests were present. Messrs. CHAS. H. CLARK, FELIX J. SCHNEIDERHAN, and T. TANAKA were elected to membership. The following papers were presented:

Egyptian use of date tree products other than fruit (with lantern): S. C. MASON. (To be published in full elsewhere.)

Botanical and economic notes on the dasheen (with lantern and exhibit): R. A. YOUNG.

The dasheens represent one type of the taro, which is well known in the Orient and the islands of the Pacific. All belong to the genus *Colocasia*. The variety under special consideration was the one known as the "Trinidad," from the island of Trinidad; it is believed to have come originally from China. Slides were shown illustrating the differences in floral and other characters between two very distinct types of *Colocasia*, which for the past sixty years have been included under the name *C. antiquorum* (L.) Schott. One of the types, which includes the dasheen, was recognized tentatively by Schott, in 1832, as a good species under the name *C. esculenta* (L.) Schott. In 1856 he reduced it to a varietal rank. The other type, which is represented by the "qolqas" or "colocasia" of Egypt, is the species *C. antiquorum*. It is contended that the reduction of *C. esculenta* to varietal rank, was an error and it is proposed to restore it to specific rank. The true *C. antiquorum* properly includes the common elephant-ear plant, generally referred to as *Caladium esculentum* of Ventenat.

The dasheen is gaining in importance in the far south, and a northern market is developing. Many culinary experiments have been made and a number of delicious and attractive dishes have resulted.

After the program, dasheens which had been parboiled and baked with electric stoves, were served.

The pathological inspection work of the Federal Horticultural Board. GEO. R. LYMAN.

The Plant Quarantine Law seeks to prevent the introduction into the United States of injurious plant diseases from abroad by requiring the inspection of imported plant material. The inspection of commercial importations presents few difficulties, inasmuch as the variety of host plants involved is not great and the importations are ordinarily from countries where the diseases are well known. But importations by the Department of Agriculture for experimental and introduction purposes present many problems, since they come from every quarter of the globe and are practically unlimited in variety of host plant. Both host and disease may be new and hence potentially dangerous. All such importations are received in a specially constructed inspection house in Washington, and the packages are opened in the presence of the inspectors, all wrappings being burned. The plant material is closely examined and suspicious specimens are referred to experts of the Department of Agriculture for study and determination. Extra-

ordinary precautions are taken to prevent infection being carried on the hands or clothing of the inspectors.

After inspection the material may be (1) passed, if it is apparently clean; (2) burned, if dangerous diseases are found; (3) ordered fumigated or cleansed when the pests found can be eradicated by such treatment (facilities for treating material are present in the inspection room); or (4) ordered grown in quarantine. The quarantine greenhouse adjoining the inspection room is divided into small units where suspicious plants may be isolated and grown under close observation until the proper disposition of them is determined.

Moreover, much of the material which passes inspection is ordered grown in the propagation gardens of the Government, one of which is situated at Yarrow, Maryland. Here the plants are propagated and grown under observation and are given a last close inspection when finally ready for distribution.

W. E. SAFFORD, *Corresponding Secretary.*

THE BIOLOGICAL SOCIETY OF WASHINGTON

The 549th regular meeting of the Biological Society of Washington was held in the Assembly Hall of the Cosmos Club, Saturday, January 29, 1916, at 8 p.m.; called to order by President HAY with thirty persons present.

The recent deaths of three members of the Society, G. D. ELLIOT, A. M. GROVES, and C. E. SLOCUM, were noted by the President. On recommendation of the Council Dr. WALTER K. FISHER, of Stanford University, was elected to active membership.

Under the heading "Brief Notes" Dr. L. O. HOWARD told of some of the published anecdotes regarding the entomologist General DEJEAN who served under Napoleon I, and of his zeal as a collector even under the excitement of battle. Also, Dr. H. M. SMITH called attention to the successful introduction of the tilefish into the markets, restaurants, and homes of the United States.

Under the heading "Exhibition of Specimens" Dr. HOWARD exhibited a photographic lantern slide of Orsini's statue, *Proximus Tuus*, representing a malarial-stricken Italian peasant. The statue was exhibited at the San Francisco fair and illustrations of it are used in a California antimosquito campaign. By way of contrast Dr. Howard showed a group of healthy children on the formerly malaria-infested Roman Campagna.

Under the same heading Mr. WILLIAM PALMER exhibited several bones of extinct cetaceans recently collected by him at Chesapeake Beach, Maryland. He called attention to the work of Cope and of other paleontologists on this group and pointed out the relationships of the forms with some of the modern cetaceans.

The regular program consisted of a paper by Dr. NED DEARBORN, *Fur farming in Alaska.* Dr. DEARBORN pointed out the possibilities of fur farming in Alaska, stating that at present there are seventy-

three localities in that territory where such farming is carried on to a greater or less extent. The possible animals that may be bred for fur are the fox, mink, marten, otter, and beaver; but so far it has only proved practicable with foxes and minks. Silver foxes are successfully bred in the interior and fed on salmon and rabbits to a large extent. Blue foxes are successfully raised along the coast, especially on certain of the islands.

The paper was discussed by Dr. C. W. STILES who called attention to the prevalence of certain forms of hookworms in the dogs and foxes of Europe and Alaska but seldom found in the dogs of the United States.

The 550th regular meeting of the Biological Society of Washington was held in the Assembly Hall of the Cosmos Club, Saturday, February 12, 1916, at 8 p.m., fifty persons being present.

On recommendation of the Council, WALTER P. TAYLOR, of the Museum of Vertebrate Zoology, Berkeley, California, was elected to active membership.

Under the heading Brief Notes and Exhibition of Specimens, L. O. HOWARD called attention to the work lately done by Dr. W. V. KING, of the Bureau of Entomology, in demonstrating that *Anopheles punctipennis* was a carrier of both tertian and aestivo-autumnal malaria parasites. He exhibited lantern slides of this mosquito and photomicrographs of the stages of the malaria organism in this hitherto supposedly harmless species of mosquito.

Under the same heading W. L. MCATEE gave some of his recent observations on the vegetation of Virginia in the region south of Washington.

The first paper of the regular program was by HENRY TALBOTT: *Nepigon.* Mr. Talbott gave an entertaining account of a trip made by himself and others to Lake Nepigon. The fishes of the lake and neighboring region were especially dwelt on. Mr. Talbot's paper was discussed by Dr. HOWARD.

The second and last paper of the regular program was by VERNON BAILEY: *Game and other mammals of the Yellowstone Park region.* Mr. Bailey gave a short outline of his recent trip through the Yellowstone Park and the neighboring region, particularly to the south. The ground covered was mainly off the tourist track. The speaker described the beauties of the park from the viewpoint of the lover of wild life; he called particular attention to the loss of fear of men by wild life when protected from guns, dogs and cats; he called to notice the thriving condition of herds of ruminants in the park and the successful efforts now made to supply hay to the needy in winter, and to keep the antelope from wandering out of the park. Mr. Bailey's communication was profusely illustrated with lantern slide views of the park and of its wild life, especially the white-tailed deer, mule deer, elk, moose (recently described as *Alces shirasi*), antelope, bison, some of the smaller mammals and Canada geese.

M. W. LYON, JR., *Recording Secretary.*

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